

# Erratum: Measurement of transverse single-spin asymmetries for $J/\psi$ production in polarized p+p collisions at $\sqrt{s} = 200$ GeV [Phys. Rev. D 82, 112008 (2010)]

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We previously reported [1] measurements of transverse single-spin asymmetries,  $A_N$ , in  $J/\psi$  production from transversely polarized  $p + p$  collisions at  $\sqrt{s} = 200$  GeV with data taken by the PHENIX experiment at the Relativistic Heavy Ion Collider in 2006 and 2008. Subsequently, we have found errors in the analysis procedures for the 2008 data, which resulted in an erroneous value for the extracted  $A_N$ . The errors affected the sorting of events into the correct left/right and forward/backward bins. This produced an incorrect value for the 2008 result, but the 2006 result is unaffected. We have conducted two independent reanalyses with these errors corrected, and we present here the corrected values for the 2008 data and the combined results for 2006 and 2008. Figures 1 and 2 replace Figs. 3 and 4 in [1]. Tables I, II, and III replace Tables I, II, and V, respectively, in [1].

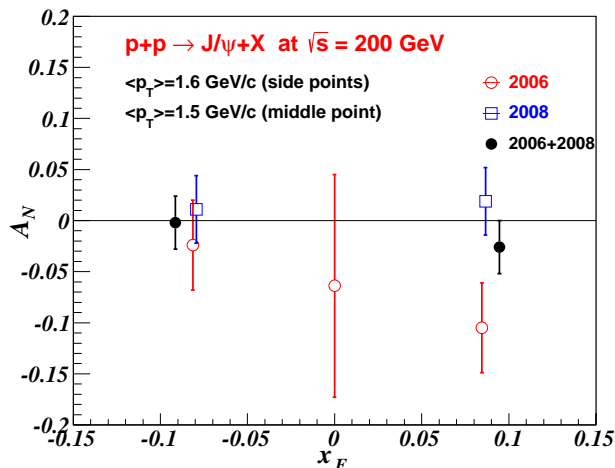


FIG. 1: (color online) Transverse single-spin asymmetry in  $J/\psi$  production as a function of  $x_F$  for 2006 and 2008 data sets separately, and the combined result; the points for the combined result have been offset by 0.01 in  $x_F$  for visibility. The error bars shown are statistical and type A systematic uncertainties, added in quadrature. Type B systematic uncertainties are not included but are 0.003 or less in absolute magnitude and can be found in Table III. Not shown is an additional uncertainty in the scale of the ordinate due to correlated polarization uncertainties of 3.4%, 3.0%, and 2.4% for the 2006, 2008, and combined 2006 + 2008 data sets, respectively.

We also made a small change in the way  $\langle x_F \rangle$  is calculated.  
\*Deceased

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culated; this did not affect the asymmetries. In the original paper, we calculated  $\langle x_F \rangle$  separately for the

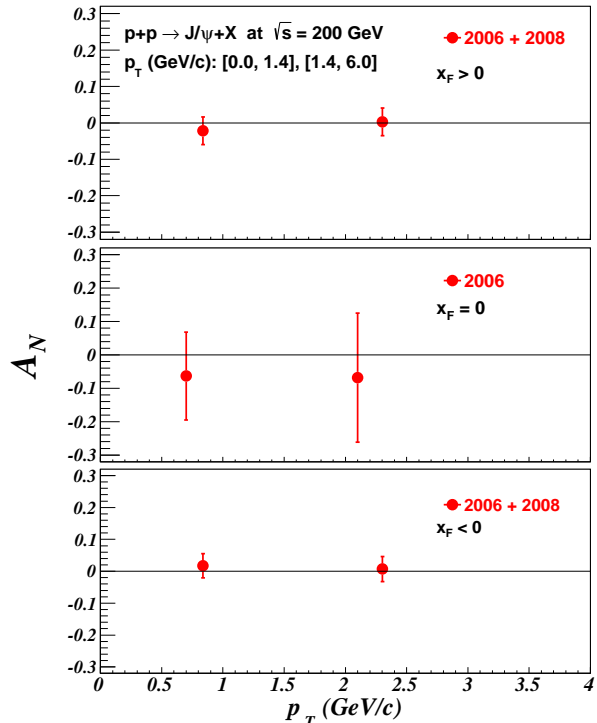


FIG. 2: (color online) Transverse single-spin asymmetry of  $J/\psi$  mesons plotted against  $J/\psi$  transverse momentum. See Table III for mean  $x_F$  values for each point. The error bars shown are statistical and type A systematic uncertainties, added in quadrature. Type B systematic uncertainties are not included but are 0.002 or less in absolute magnitude and can be found in Table III. An additional uncertainty in the scale of the ordinate due to correlated polarization uncertainties is 2.4% (3.4%) for the points with  $|x_F| > 0$ . ( $x_F = 0$  is not shown.)

North and South muon spectrometers, but this does not exactly represent the way the data are combined to form an asymmetry; we fixed this in Tables I–III. The new combined spin asymmetry in the forward region is  $A_N = -0.026 \pm 0.026(\text{stat}) \pm 0.003(\text{sys})$ . Since this asymmetry is consistent with zero, we no longer claim that our results suggest a possible non-zero trigluon correlation function in transversely polarized protons.

TABLE I: Background asymmetries as a function of  $p_T$  for PHENIX muon spectrometers. The uncertainties given are statistical.

$p_T$ (GeV/c)	$\langle x_F \rangle$	data set	$A_N^{BG}$
0–6	-0.083	2006	$-0.003 \pm 0.028$
	-0.084	2008	$0.041 \pm 0.035$
	0.083	2006	$-0.008 \pm 0.028$
	0.084	2008	$-0.010 \pm 0.036$
0–1.4	-0.083	2006	$-0.021 \pm 0.034$
	-0.085	2008	$0.033 \pm 0.043$
	0.083	2006	$0.002 \pm 0.034$
	0.085	2008	$0.023 \pm 0.044$
1.4–6	-0.083	2006	$0.001 \pm 0.053$
	-0.084	2008	$0.019 \pm 0.075$
	0.083	2006	$-0.039 \pm 0.053$
	0.084	2008	$-0.038 \pm 0.076$

TABLE II: Total background fractions as a function of  $p_T$  for muon spectrometers on the north and south sides of PHENIX. Backgrounds were higher in the 2006 data set because the less restrictive trigger requirement allowed more random track combinations.

$p_T$ (GeV/c)	data set	detector	background fraction (%)
0–6	2006	South	$21.7 \pm 0.6$
	2006	North	$19.1 \pm 0.4$
	2008	South	$16.2 \pm 0.2$
	2008	North	$14.1 \pm 0.2$
0–1.4	2006	South	$23.2 \pm 0.7$
	2006	North	$22.0 \pm 0.7$
	2008	South	$15.9 \pm 0.3$
	2008	North	$15.6 \pm 0.3$
1.4–6	2006	South	$20.1 \pm 0.8$
	2006	North	$14.1 \pm 0.5$
	2008	South	$15.7 \pm 0.4$
	2008	North	$9.7 \pm 0.2$

TABLE III:  $A_N$  vs.  $p_T$  in forward, backward and midrapidity. Systematic uncertainties in the last two columns are due to the geometric scale factor and the polarization, respectively. There are additional Type C uncertainties due to the polarization of 3.4%, 3.0%, and 2.4% for the 2006, 2008, and combined 2006 and 2008 results.

$p_T$ (GeV/c)	Data Sample	$\langle x_F \rangle$	$A_N$	$\delta A_N$ (stat.)	$\delta A_N$ (Type A syst.)	$\delta A_N^f$ (%) (Type B syst.)	$\delta A_N^p$ (%) (Type B syst.)
	2006	-0.083	-0.024	0.044	0.003	0.6	2.3
	2008	-0.084	0.011	0.033	0.004	0.4	3.4
	2006 + 2008	-0.084	-0.002	0.026	0.002	0.4	2.8
0–6	2006	0.000	-0.064	0.106	0.026	0.6	2.3
	2006	0.083	-0.105	0.044	0.005	0.6	2.3
	2008	0.084	0.019	0.033	0.003	0.4	3.3
	2006 + 2008	0.084	-0.026	0.026	0.003	0.4	2.7
	2006	-0.083	0.050	0.067	0.007	0.6	2.3
	2008	-0.085	0.001	0.047	0.008	0.4	3.4
	2006 + 2008	-0.084	0.017	0.038	0.005	0.4	2.8
0–1.4	2006	0.000	-0.063	0.128	0.031	0.6	2.3
	2006	0.083	-0.065	0.066	0.005	0.6	2.3
	2008	0.085	0.0003	0.047	0.003	0.4	3.4
	2006 + 2008	0.084	-0.022	0.038	0.003	0.4	2.7
	2006	-0.083	-0.073	0.065	0.002	0.6	2.3
	2008	-0.084	0.051	0.048	0.010	0.4	3.5
	2006 + 2008	-0.084	0.007	0.039	0.002	0.4	2.8
1.4–6	2006	0.000	-0.068	0.188	0.045	1.2	2.3
	2006	0.083	-0.046	0.064	0.005	0.6	2.3
	2008	0.084	0.030	0.047	0.007	0.4	3.3
	2006 + 2008	0.084	0.003	0.038	0.004	0.4	2.7